KVADRAT

Air Defence Missile System Modernisation (1st stage)

Mission

The modernised Kvadrat medium-range air defence missile system is designed to defend friendly troops and installations against modern high-speed manoeuvring strategic and tactical aircraft, as well as against attack helicopters and cruise missiles, under conditions of mass attack, in hostile electronic countermeasures and fire counteraction environment.

Scope of modernisation

The upgrading of the Kvadrat ADM system envisages modification of:

(a) the SURN reconnaissance and guidance radar post:

- replacement of the analogue moving target selection system with a digital one, featuring a suppression coefficient increased up to 28 - 30 dB;
- introduction of the tracked target classification system (aircraft, helicopter, cruise missile and other classes of air targets);
- extention of the illumination channel waveband from 6 to 12 lettered frequencies;
- replacement of electro-vacuum UHF amplifiers with solid-state ones, including substitution of their high-voltage power units for low-voltage ones, as well as introducing new electronic elements;
- replacement of the cathode-ray tubes of display system with colour LCDs, which notably increases the amount of data displayed and extends service life (up to 10,000 - 15,000 hours), and also reduces power consumption and the number of operating adjustments;

(b) the self-propelled launcher vehicle:

- introduction of testing and monitoring system providing real-time recording with subsequent playback of all data on operation of the ADMS major elements including radar, launcher and missiles.

The ADMS is equipped with a testing and measuring equipment set providing integral check-up of radar/launcher electronic equipment.

A follow-on modernisation of the Kvadrat ADMS envisages considerable improvement of its combat capabilities by introducing some of the elements of the advanced Buk-M1-2 medium-range ADMS.

IGLA

Man-Portable Air Defence Missile System

Mission

The Igla man-portable air defence system is designed to engage visible turbo-jet, turbo-prop and piston-engined aircraft, as well as helicopters and remotely piloted vehicles, both approaching and receding, under conditions of natural cluster and man-made IR interferences.

Composition

- combat assets
- maintenance assets
- training assets

The combat assets include: 9M39 SAM in the launch tube, and 9P516 launching mechanism.

The launch tube can mount a night sight and an IFF interrogator.

The maintenance assets include mobile and stationary test equipment for checking combat/training missiles in launch tubes, and launching mechanisms.

The training assets include training equipment, mock-ups and other assets to help develop firm skills in operating the system.

Modernisation

A new-generation 9K338 Igla-S MANPADS is a follow-on derivative of the Igla MANPADS. It features a new warhead with considerably increased HE charge and number of fragments, laser impact/proximity fuse and new homing (guidance) system, providing higher accuracy and increased (to 6 km) killing range.

The upgraded Igla-S MANPADS has the same weight and size as the predecessor, as well as launch preparation and maintenance procedures. The 9F859 Konus versatile simulator is developed for training Igla-S systems operators. It also includes training means for Igla and Igla-1 system operators.

The Igla-S is two-three times superior to the baseline Igla system in terms of combat effectiveness, especially when used against cruise missiles and small-size air targets.

Basic specifications	
Target engagement envelope, m:	
range	500 – 5,200
altitude	10 –3,500
Approaching/receiding target speed, m/s	up to 400/320
Guidance mode	homing
Control system	single channel
Type of homing head	heat-seeking (passive)
Warhead explosives weight, kg	0.405
Fuse type	impact deep penetrating
Reaction time, sec	not more than 5
Deployment time, sec	not more than 13
Combat assets weight, kg	18
Crew	1

9S520 NIGHT LAUNCH CAPABILITY ASSETS

for Igla-type MANPADS

Mission

The 9S520 assets are designed to increase Igla MANPADS combat effectiveness by day and night, as well as to ensure fire control of an AD section consisting of 3 - 4 crews.

Composition

- one to three sets of individual target designation assets, comprising the support structure, transmission lines with a reel and cable (50 m), MANPADS-to-support structure joint, 1PN72M night sight and three sets of the PNV 90V-1 night vision goggles
- 1L110-2 hand-held electronic plotting board with the Arbalet-1U radio set, the TLM-1 unit, fittings, and electric power supply cables
- a set of satellite navigation system equipment
- spare parts, tools and accessories set, with back-up power supply source and charger
- test and monitoring equipment with an SPTA set, and operating manuals

The night launch capability assets ensure:

- reception of telecoded alerts from control posts - 9S80M(M1), 9S737M, PU-12M (M4, M6, M7, or P-19 type radars of various modifications represented in the single topographic/survey reference system with target coordinates recalculated in relation to positions of Igla operators;
- presentation of target coordinates, their identification and composition data on the portable electronic plotting board;
- address transfer of relevant target distribution and designation data on azimuth and range, as well as voice and visual information to Igla operators;
- search for and acquisition of aerial targets, aiming SAMs at them by day and night, as well as increase of target detection probability and range in daytime.

Basic specifications	
Displayed air situation zone, km	25.6 x 25.6 and 51.2 x 51.2
Number of simultaneously displayed targets	up to 4
Target tracking by EPB	automatic
Reception of target designation data form launchers	address and broadcasting
Data presentation on SAM operator's daytime indicator or night sight, km:	
range	0 – 9.9
azimuth	«left», «right»
Aircraft detection probability:	
in daytime within 6-km limit (15-km visibility range)	0.9
at night within 2-km limit (illumination of $3x10^{-3}$ lux)	0.6
Overall weight, kg	80
Crew	3 - 4

203-OPU DZHIGIT

MANPADS Pedestal Launcher

Mission

The 203-OPU Dzhigit ground/vehicle-based MANPADS pedestal launcher is designed to carry two combat-ready Igla-type SAMs allowing one operator to aim and launch one missile after another or two missiles simultaneously against approaching and receding targets in manual and automatic modes.

The launcher complex improves kill probability by up to 1.5 times thanks to the salvo firing of two missiles, and reduced time between one-missile-at-a-time launches. Ergonomically designed launcher provides ease of operator's combat handling procedures.

Additionally, the Dzhigit launcher can be fitted with a night sight and an IFF interrogator using the same frequency band and operating modes as the MkX/MkXII system, as well as with target designation assets.

A test vehicle and test-and-monitoring equipment are used to provide functional testing of the launcher and its components and localize malfunctions, as well as to provide maintenance of the launcher.

Basic specifications	
Dimensions in deployed position, mm:	
pedestal-mounting diameter	2,180
height	1,546
weight of tilting part	1,304
Launcher weight (w/o missiles), kg	128

LAUNCH MODULE & CONTROL EQUIPMENT SET

for Igla-type MANPADS

Mission

The launch module and control equipment for Igla-type MANPADS is designed to ensure automated remote launch of portable SAMs in different modes: single, successive (2-8 SAMs) or salvo (2 SAMs at a time from different launchers) launches from ground, sea and air platforms.

Composition

- versatile launch module (up to four units)
- control and communications equipment (one set)
- set of connectors
- control panel
- synchroniser
- testing and monitoring equipment
- SPTA set

Basic specifications	
Number of missiles in launch module	2
Missile types	Igla-1, Igla, Igla-S
Max number of missile «power-on's» in LM (w/o replacing disposable power supply sources)	not less than 4
Sighting mode	(a) line-of-sight (b) target designation at ±10 deg off homing head axis
Reaction time, sec	6.5
Mean time between failures, hrs	500